

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-53 (Canceled).

54. (New) An article comprising a panel structure mountable in an automobile vehicle to form a part of a vehicle interior thereof, the panel structure having an exterior surface, at least a portion of which is exposed to the vehicle interior, and an interior surface which is hidden from the vehicle interior when the panel structure is mounted in the automobile vehicle, said panel structure comprising:

a reinforcing substrate;

a layered composite structure comprising an outer layer defining at least a portion of said exterior surface of the panel structure and an inner layer, said layered composite structure being united to a surface of said reinforcing substrate so that said reinforcing substrate serves to reinforce said outer layer;

said outer layer comprising an at least substantially dried, light-stable, crosslinked polyurethane formulated from a water-dispersed first composition comprising at least one coloring agent, at least one light-stable aliphatic thermoplastic polyurethane containing at least one pendent functional group selected from the group consisting of hydroxyl and carboxyl functional groups, and at least one heat-activated crosslinking agent, said light-stable aliphatic thermoplastic polyurethane being molded with and at least partially crosslinked by the heat-activated crosslinking agent; and

said inner layer being thicker than said outer layer and being formed directly on said outer layer such that said inner layer has a surface adjacent to and interfacial chemical bonds with an inner surface of said outer layer, said inner layer and said interfacial chemical bonds being formed by applying a composition comprising a thermoplastic polyurethane resin

material having at least one ethylenically unsaturated bond in its backbone, at least one pendent hydroxyl group, or a combination thereof onto said inner surface of said outer layer.

55. (New) An article according to claim 54, wherein the heat-activated crosslinking agent is carbodiimide.

56. (New) An article according to claim 55, further comprising a relatively rigid polyurethane cellular foam interposed between said layered composite structure and said reinforcing substrate that adheres said layered composite structure to said reinforcing substrate, wherein said outer layer is provided with a compressing feel by said relatively rigid polyurethane cellular foam and said inner layer.

57. (New) An article according to claim 56, wherein said outer layer has a thickness in a range of from about 1.0 mils to about 1.5 mils.

58. (New) An article according to claim 56, wherein said inner layer has a thickness in a range of from about 40 mils to about 60 mils.

59. (New) An article according to claim 56, wherein said at least one light-stable aliphatic thermoplastic polyurethane and said heat-activated crosslinking agent can be premixed and stably stored for at least up to 24 hours at room temperature.

60. (New) An article according to claim 56, wherein said panel structure is a door panel.

61. (New) An article according to claim 56, wherein said panel structure is an instrument panel.

62. (New) An article according to claim 54, wherein the water-dispersed composition has a water concentration of from about 10% by weight to about 80% by weight.

63. (New) An article according to claim 54, wherein the water-dispersed composition has a solvent concentration of from about 9% by weight to about 15% by weight.

64. (New) An article according to claim 63, wherein the solvent is N-methyl pyrrolidone.

65. (New) An article according to claim 64, wherein the water-dispersed composition further comprises at least one member selected from the group consisting of glycol ether acetate and xylene.

66. (New) A process for making a panel structure mountable in an automobile vehicle to form a part of a vehicle interior thereof, the panel structure comprising a reinforcing substrate and a layered composite structure, the reinforcing substrate being hidden from the vehicle interior when the panel structure is mounted in the automobile vehicle, the layered composite structure comprising an outer layer defining at least a portion of an at least partially exposed exterior surface of the panel structure and an inner layer, said process comprising the steps of:

applying a water-dispersed composition onto a first mold surface having a complementary shape to an outer surface of the outer layer, the water-dispersed composition comprising at least one light-stable aliphatic thermoplastic polyurethane containing at least one pendent functional group selected from the group consisting of hydroxyl and carboxyl functional groups, at least one coloring agent, and at least one heat-activated crosslinking agent;

applying sufficient heat for inducing partial crosslinking of the light-stable aliphatic thermoplastic polyurethane with the heat-activated crosslinking agent;

substantially drying the water-dispersed composition while on the first mold surface for forming the outer layer;

casting a composition comprising a thermoplastic polyurethane resin material having at least one ethylenically unsaturated bond in its backbone, at least one pendent

hydroxyl group, or a combination thereof onto an inner surface of the outer layer while on the first mold surface for forming the inner layer which comprises the thermoplastic polyurethane resin material at least partially crosslinked with the light-stable aliphatic polyurethane of the outer layer via unreacted functional groups of the heat-activated crosslinking agent and for interfacially chemically bonding the inner surface of the outer layer to an adjacent surface of the inner layer; and

uniting the layered composite structure with the reinforcing substrate so that the reinforcing substrate reinforces the outer layer while retaining a touch, color, and configuration of the exposed portion.

67. (New) A process according to claim 66, wherein the heat-activated crosslinking agent is carbodiimide.

68. (New) A process according to claim 67, further comprising the steps of:
transferring the layered composite structure from the first mold surface to a second mold surface; and

providing the reinforcing substrate on a third mold surface having a complementary surface to an interior surface of the panel structure,
wherein said uniting step comprises applying a reactive mixture to the layered composite structure while on the second mold surface or to the reinforcing substrate provided on the third mold surface, arranging the second and third mold surfaces so that the layered composite structure and the reinforcing substrate collectively define a mold cavity for accommodating the reactive mixture, and foaming the reactive mixture for forming a relatively rigid polyurethane cellular foam that adheres the reinforcing substrate to the layered composite structure, and

wherein the outer layer is provided with a compressing feel by the relatively rigid polyurethane foam and the inner layer.

69. (New) A process according to claim 67, further comprising the steps of:

transferring the layered composite structure from the first mold surface to a transparent surface of a holding platform;

detecting and reinforcing rupturable portions of the layered composite structure for preventing failure of the same during said uniting step;

transferring the layered composite structure from the transparent surface to a second mold surface; and

providing the reinforcing substrate on a third mold surface having a complementary shape to an interior surface of the panel structure,

wherein said uniting step comprises applying a reactive mixture to the layered composite structure while on the second mold surface or to the reinforcing substrate provided on the third mold surface, arranging the second and third mold surfaces so that the layered composite structure and the reinforcing substrate collectively define a mold cavity for accommodating the reactive mixture, foaming the reactive mixture for forming a relatively rigid polyurethane cellular foam that adheres the reinforcing substrate to the layered composite structure, and

wherein the outer layer is provided with a compressing feel by the relatively rigid polyurethane foam and the inner layer.

70. (New) A process according to claim 67, wherein said drying step is performed by evaporating the water from the water-dispersed composition.

71. (New) A process according to claim 67, wherein the outer layer has a thickness in a range of from about 1.0 mils to about 1.5 mils.

72. (New) A process according to claim 67, wherein the inner layer has a thickness in the range of from about 40 mils to about 60 mils.

73. (New) A process according to claim 67, further comprising the step of precoating the first mold surface with a microcrystalline wax mold releasing agent.

74. (New) A process according to claim 67, wherein the light-stable aliphatic thermoplastic polyurethane and the heat-activated crosslinking agent can be premixed and stably stored prior to said applying step for at least up to 24 hours at room temperature.

75. (New) A process according to claim 67, wherein the first mold surface is heated during said applying step.

76. (New) A process according to claim 67, wherein the first mold surface has a complementary shape to an exterior surface of a door panel.

77. (New) A process according to claim 67, wherein the first mold surface has a complementary shape to an exterior surface of an instrument panel.

78. (New) A process for making a panel structure mountable in an automobile vehicle to form a part of a vehicle interior thereof, the panel structure comprising a reinforcing substrate and a layered composite structure, the reinforcing substrate being hidden from the vehicle interior when the panel structure is mounted in the automobile vehicle, the layered composite structure comprising an outer layer defining at least a portion of an at least partially exposed exterior surface of the panel structure and an inner layer, said process comprising the steps of:

providing a microcrystalline wax mold releasing agent on a first mold surface, the first mold surface being heated to a first elevated temperature for melting and dispersing the microcrystalline wax mold releasing agent;

applying a water-dispersed composition onto the first mold surface having a complementary shape to an outer surface of the outer layer and containing the microcrystalline wax mold releasing agent dispersed thereon, the water-dispersed composition comprising at least one light-stable aliphatic thermoplastic polyurethane containing at least one pendent functional group selected from the group consisting of hydroxyl and carboxyl functional groups, at least one coloring agent, and at least one heat-activated crosslinking agent, the first mold surface being heated to a second elevated

temperature for inducing at least a partial crosslinking of the light-stable aliphatic thermoplastic polyurethane with the heat-activated crosslinking agent;

substantially drying the water-dispersed first composition while on the first mold surface by heating the first mold surface to a third elevated temperature for forming the outer layer with an exterior surface;

casting a second composition comprising a thermoplastic polyurethane resin material having at least one ethylenically unsaturated bond in its backbone, at least one pendent hydroxyl group, or a combination thereof onto an inner surface of the outer layer while on the first mold surface to form the inner layer which comprises the polyurethane at least partially crosslinked with the light-stable aliphatic thermoplastic polyurethane of the outer layer via unreacted functional groups of the heat-activated crosslinking agent for forming the layered composite structure comprising interfacial chemical bonding between the inner surface of the outer layer to an adjacent surface of the inner layer; and

uniting the layered composite structure with the reinforcing substrate so that the reinforcing substrate reinforces the outer layer while retaining a touch, color, and configuration of the exposed portion.

79. (New) A process according to claim 78, wherein the heat-activated crosslinking agent is carbodiimide.

80. (New) A process according to claim 79, wherein the first elevated temperature, second elevated temperature, and third elevated temperature are all the same and in a range of from about 140°F to about 160°F.